green. Again, the color label refers only to a distinguishing property, not an appearance. Each kind of quark has an antimatter counterpart, an antiquark. **Baryons** are composed of three quarks, each of a different color. Mesons are composed of a quark and an antiquark of complimentary color. It is believed that quarks hold together by exchanging "particles" called **gluons.** There are believed to be eight gluons, each of which is characterized by one color and one anti-color. In a similar manner, the nucleons are held together in the nucleus by the exchange of pions.

Three forms of radiation can come from naturally radioactive nuclei. Two forms consist of particles. The third consists of energy. The particles are alpha (α) and beta (β) particles. The energy consists of gamma (γ) rays. An **alpha particle** is a helium nucleus and consists of two protons and two neutrons. A **beta particle** is a high-speed electron emitted from radioactive nuclei. Electrons do not exist as such in the nucleus but are generated at the instant of decay. **Gamma rays are** very high-energy x-rays. Unstable nuclei that emit rays or particles to become stable nuclei are said to decay. Scientists have also created many radioactive nuclides that do not exist in nature on Earth.

HADRONS

Baryons
- *Protons*
- *Neutrons*
- *Other short-lived particles*

Mesons
- *Pions*
- *Kaons*
- *Other short-lived particles*

SUBATOMIC PARTICLES (a selective listing)			
Particle	Mass (AMU)	Charge	Lifetime
electron	1	±	infinite
electron's neutrino	0	0	infinite
muon	207	±	2.2×10^{-6} s
pion	273	±	2.6×10^{-8} s
kaon	966	±	1.24×10^{-8} s
eta	1074	0	2.53×10^{-19} s
rho	1507	±, 0	4×10^{-23} s
proton	1836	+	inifinite
neutron	1839	0	0.93×10^{3} s
lambda	2183	0	2.5×10^{10} s
sigma	2328	±,0	8.1×10^{-11} s
delta	2410	±,0	4×10^{23} s
tau meson	3522	±	???
upsilon	18,590	0	???